

REMARKS

By this amendment claim 13 is amended. Support for the changes to claim 13 is found in the specification, *inter alia*, at page 9, lines 14-22, page 14, lines 23-27, and in Figure 9. Claims 1-12, 18, 20 and 24 stand withdrawn from consideration and claim 14 has been cancelled. Claims 13, 15-17, 19, 21-23 and 25 are presented for further examination.

The rejection of claims 13, 16, 23 and 25 under 35 U.S.C. § 103(a) over Taguchi, US 6,469,448, in view of Baldwin, US 6,280,563, is respectfully traversed with respect to the amended claims.

The invention relates to a plasma processing apparatus for supplying radio-frequency power into a process chamber so as to generate plasma in order to treat an object to be processed with the plasma. Independent claim 13 requires, in pertinent part, that a plurality of metal-based radio-frequency antennas are disposed in the process chamber to provide linear lines, wherein a curved portion may be present in the linear line, so that the directions of the respective electric currents in adjacent antennas are the same. Claim 13 further requires that the process chamber has a chamber wall having at least one antenna so that the antenna penetrates the chamber wall into the inside of the process chamber.

With the above structure, the direction of the electric currents flowing in adjacent antennas is the same, so that the respective electric fields due to the electric currents are strengthened by each other due to interactions therebetween (page 9, line 31-page 10, line 4). Further, the claimed plasma

processing apparatus can generate high density plasma with high efficiency, even in the case of treatment of objects having a large area (specification at page 18, lines 4-8).

None of the cited references, either considered alone or in any possible combination, teach or suggest all of the claimed structural relationships. Pointedly, none of the references teach or suggest antennas disposed in a process chamber to provide linear lines so that the directions of the respective electric currents in adjacent antennas are the same.

Taguchi discloses an inductively coupled RF plasma source that comprises a plurality of one-turn antenna coils (abstract). The coiled antenna, however, does not provide linear lines, much less linear lines such that directions of the respective electric currents in adjacent antennas are the same. This deficiency of Taguchi is not remedied by Baldwin, who also teaches a coiled antenna. As with Taguchi, the coiled antenna of Baldwin does not provide linear lines. In view of the foregoing, reconsideration and withdrawal of the rejection are respectfully requested.

The rejection of claims 15 and 19 under 35 U.S.C. § 103(a) over Taguchi and Baldwin, and further in view of Glukhoy, US 2003/0168172, the rejection of claim 17 under 35 U.S.C. § 103(a) over Taguchi and Baldwin, and further in view of Holland, US 5,975,013, or Takagi, US 2004/0020432, and the rejection of claims 21 and 22 under 35 U.S.C. § 103(a) over Taguchi and Baldwin, and further in view of Grimbergen, US 6,390,019, are respectfully traversed.

Claims 15, 17, 19, 21 and 21 depend from claim 1 and thus are patentable over the cited references for at least the reasons that claim 1 is patentable.

Specifically, none of the secondary references of Glukhoy, Holland, Takagi, or Grimbergen remedy the deficiencies of Taguchi with respect to claim 1.

The process chambers of both Holland and Grimbergen comprise a coiled antenna, and not an antenna having linear lines such that that directions of the respective electric currents in adjacent antennas are the same. Further, the respective coiled antennas of both Holland and Grimbergen are located outside a process chamber and not in a process chamber, as required by the claims (see, e.g., abstract of Holland and column 6, lines 64-67 of Grimbergen).

Glukhoy discloses a plasma treatment apparatus in which the adjacent ends of antenna tubes are connected electrically by conductors such that the plasma generating tubes are connected in series in the form of a conductive spiral body (see, e.g., paragraph [0037]). By connecting adjacent ends of the antenna tubes in series, the directions of the respective electric currents in the adjacent antennas of Glukhoy will be opposite to each other, and not the same.

In a similar vein, Takagi discloses an electrode which is folded back at the center and which has a feeding portion at the first end and a grounded portion at the second end (abstract). With such a configuration, the electric currents in the adjacent antennas of Takagi will be opposite to each other, and not the same. Because none of the cited references fairly teach or suggest antennas disposed in a process chamber to provide linear lines so that the directions of the respective

electric currents in adjacent antennas are the same, reconsideration and withdrawal of the rejections are respectfully requested.

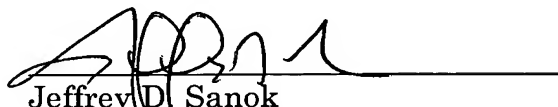
In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned at (202) 624-2995 would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #101249.52602US).

Respectfully submitted,

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